Assessing the Impacts of Urbanization on Shellfish Growing Areas in Puget Sound, Washington

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Shellfish are icons of the Pacific Northwest, associated with many recreational,cultural and economic values. Clean water is essential for shellfish harvesting. However, an increase in human population and development within nearshore environments and adjacent watersheds has degraded water quality, resulting in increased closures for shellfish harvesting, as well as fishing and contact recreational activities such as boating and swimming. While research has long demonstrated that urbanization alters water quality in upland streams and rivers, primarily through the loss of native vegetative cover, increased impervious surfaces, altered hydrology and other impacts, the relationships between patterns of landscape alteration and the health of shellfish growing areas are generally not well understood. The research project highlighted in this presentation explored relationships between urbanization and nearshore water quality using a landscape scale analysis of Puget Sound. In a regional comparison of Puget Sound shellfish bays, a landscape scale empirical analysis of several urbanizing basins was conducted. The study sites were selected to span gradients of urban land-use and land-cover patterns. Using bacterial contamination as the indicator of nearshore water quality conditions, we developed a cross-sectional analysis across the study basins to assess what landscape factors best explain water quality conditions in Puget Sound's shellfish growing areas. Across all basins, we found that forest fragmentation in the drainage basin and impervious surface area are the best predictors of nearshore water quality conditions. Within the more urbanized areas, the amount and connectivity of the impervious surface explained most of the variance in bacterial pollution. The findings of these studies have implications for land-use and stormwater management policies.